Heart Failure

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What Is Heart Failure?

Heart failure is a condition where the heart cannot pump enough blood throughout the body. Heart failure does not mean that your heart has stopped or is about to stop working. It means that your heart is not able to pump blood the way that it should. The heart cannot fill with enough blood or pump with enough force or both.

Heart failure develops over time as the pumping action of the heart grows weaker. It can affect the left side, the right side, or both sides of the heart. Most cases involve the left side where the heart cannot pump enough oxygen-rich blood to the rest of the body. With right-sided failure, the heart cannot effectively pump blood to the lungs where the blood picks up oxygen.

The weakening of the pumping ability of the heart causes:

- Blood and fluid to "back up" into the lungs
- The buildup of fluid in the feet, ankles, and legs
- Tiredness and shortness of breath

Heart failure is a serious condition. About 5 million people in the U. S. have heart failure and the number is growing. Each year, another 550,000 people are diagnosed for the first time. It contributes to or causes about 300,000 deaths each year. How the Heart Works

Your heart is a muscle that is about the size of your fist. It works like a pump and it is always pumping blood throughout the body. The average heart beats 100,000 times a day.

The heart has a left and right side, separated by a wall of muscle called the septum. Blood vessels called veins bring blood to the heart, while other blood vessels called arteries carry blood away from the heart. Here is what happens:

- Blood from your body enters the right side of your heart through veins. The blood is dark because it has given all its oxygen to your body.
- The right side of the heart pumps the blood through the pulmonary artery to your lungs to pick up oxygen.
- After traveling through the lungs, the blood turns bright red because it is rich in oxygen.
- The oxygen-rich blood then returns to the left side of your heart and is pumped out to your body through the large artery called the aorta.

Heart chambers. The heart has four chambers or "rooms"-two on each side. The upper chambers are called atria and the lower chambers are called ventricles. The atria collect

blood as it comes into the heart. As your heart beats, blood is pumped from the atria through valves down into the ventricles. Then, blood is pumped from the ventricles out of the heart through different valves.

Heart valves. The heart has four valves that open and close, like doors, to control the flow of blood through the heart in one direction. The four valves are:

- Tricuspid valve, between the right atrium and the right ventricle
- Pulmonary valve, between the right ventricle and the entrance to the pulmonary artery
- Mitral valve, between the left atrium and the left ventricle
- Aortic valve, between the left ventricle and the entrance to the aorta.

Each time your heart beats, it makes the familiar "lub-DUB" sounds. These are the sounds of valves in the heart closing.

Arteries. The arteries attached to the heart are:

- The aorta, the main artery that carries oxygen-rich blood from the left side of the heart to the body
- The pulmonary artery, which carries blood from the right side of the heart to the lungs to pick up oxygen.
- The heart also has arteries on its outside surface called the coronary arteries. These important arteries supply the heart muscle itself with the oxygen-rich blood it needs to work normally.

Other Names for Heart Failure

- Congestive heart failure or CHF (when the poor pumping function results in symptoms)
- Left-sided heart failure
- Right-sided heart failure
- Systolic heart failure
- Diastolic heart failure

What Causes Heart Failure?

Heart failure is caused by other diseases or conditions that damage or overwork the heart muscle. Over time the heart muscle weakens and is not able to pump blood as well as it should.

The leading causes of heart failure are :

- Coronary artery disease (CAD)
- High blood pressure
- Diabetes.
- CAD, including angina and heart attack, is the most common underlying cause of heart failure. Persons who have a heart attack are at high risk of developing heart failure.

Most people with heart failure also have high blood pressure and about 1 in 3 has diabetes.

Other Causes of Heart Failure

- Other heart diseases and conditions that can lead to heart failure are:
- Cardiomyopathy (a disease of the heart muscle)
- Diseases of the heart valves
- Abnormal heartbeats or arrhythmias
- Congenital heart disease (a heart defect or problem you are born with).
- Other conditions that may injure the heart muscle and lead to heart failure include:
- Treatments for cancer such as radiation and certain chemotherapy drugs
- Thyroid disorders-having either too much or too little thyroid hormone in the body
- Alcohol abuse
- HIV/AIDS
- Cocaine and other illegal drugs use.

Who Gets Heart Failure?

Heart failure can happen to anyone, but it is more common in:

- People 65 years of age and older
- African Americans.
- Heart failure is very common in persons 65 years of age and older. It is the number one reason for a hospital visit in this group.

Blacks are more likely to have heart failure and suffer more severely from it. Blacks are more likely to:

- Develop symptoms at an earlier age
- Have their heart failure get worse faster
- Have more hospital visits
- Die from heart failure.
- Men also have a higher rate of heart failure than women. But in actual numbers, more women have heart failure because many more women live into their 70s and 80s when heart failure is common.

Children with congenital heart disease can also get heart failure. Congenital heart disease happens when the heart, heart valves, and/or blood vessels near the heart do not develop correctly in babies when they are in the womb. This can weaken the heart muscle and lead to heart failure. Children do not have the same symptoms or get the same treatment for heart failure as adults and will not be discussed here.

What Are the Signs and Symptoms of Heart Failure?

The most common signs and symptom are:

- Shortness of breath or difficulty breathing
- Feeling tired
- Swelling in the ankles, feet, legs, and sometimes the abdomen.
- Shortness of breath and feeling tired are caused by the buildup of fluid in the lungs and around the lung (pleural effusions). When symptoms start, you may feel tired and short of breath after routine physical exertion. Climbing two flights of stairs makes you feel winded. As heart failure progresses, the symptoms get worse. You may begin to feel tired and short of breath after simple activities, like getting dressed or walking across the room. Some people have shortness of breath when lying flat.

Fluid buildup in the lungs can also cause a cough. The cough is worse at night and when you are lying down. Excessive fluid in the lungs can cause a life-threatening condition called acute pulmonary edema. This condition requires emergency treatment.

The swelling is from the buildup of fluid in your body (edema). Other signs of fluid buildup are:

- Weight gain
- Frequent urination.
- Limitation on Physical Activity

Doctors also classify your symptoms based on how much they limit your daily activity. By class of symptom, your doctor means:

- **Class 1**: No limits--ordinary physical activity does not cause undue tiredness or shortness of breath.
- **Class 2**: Slight or mild limits--comfortable at rest, but ordinary physical activity results in tiredness or shortness of breath.
- **Class 3**: Marked or noticeable limits--comfortable at rest, but less than ordinary physical activity causes tiredness or shortness of breath.
- **Class 4**: Severe limits--unable to carry on any physical activity without discomfort. Symptoms are also present at rest. If any physical activity is undertaken, discomfort increases.

How is Heart Failure Diagnosed?

There is not a specific test to determine if you have heart failure. A clinical diagnosis of heart failure is usually made when symptoms appear. The symptoms--shortness of breath, tiredness, and fluid buildup--are common in other conditions.

Your doctor will determine if you have heart failure by doing a detailed medical history, a physical examination, and several tests. The purpose of these is to:

- Identify the presence of diseases and conditions that can cause heart failure
- Rule out other causes of your symptoms
- Determine the amount of damage to and the pumping capability of your heart.

Medical and Family History

Your doctor will ask if you or others in your family have or have had any of the diseases and conditions that can cause heart failure. Your doctor will also ask about your symptoms. This includes the types of symptoms, when they occur, how long you have had them, and their severity. The answers will help your doctor determine the limits on your ability to perform daily activities.

Physical Examination

Your doctor will:

- Listen to your heart for abnormal sounds
- Listen to your lungs for the buildup of fluid
- Look for swelling in your ankles, feet, legs, and abdomen
- Look for swelling in the veins in the neck.

Tests

If you have signs and symptoms of heart failure, your doctor may order the following tests:

- **EKG or ECG (electrocardiogram).** This test is used to measure the rate and regularity of your heartbeat. It may show if you have had a heart attack or have thickening of the walls of the pumping chambers of the heart (ventricles).
- **Chest x-ray**. A chest x-ray takes a picture of your heart and lungs. It can show if your heart is enlarged, if you have fluid in your lungs, or if you have lung disease.
- **BNP blood test.** This new test checks the level of a hormone called BNP (B-type natriuretic peptide) that rises in heart failure.

If your doctor suspects heart failure after the history, physical exam, and initial tests (such as tests of kidney function), he/she may refer you to a cardiologist. A cardiologist is a doctor who specializes in the diagnosis and treatment of heart disease. The cardiologist will do a physical exam and order additional tests.

An **echocardiogram** is the most useful test for diagnosing heart failure. This test uses sound waves to create a picture of the heart. It shows how well the heart is filling with blood and pumping it to the rest of the body. It can also show the areas of your heart muscle that are not contracting normally. Your doctor uses this test to determine the areas of your heart that are damaged and causing it to not work properly. This is very important because more than one area of the heart can be damaged and contribute to heart failure.

The cardiologist may order any of the following tests. These tests can help identify the cause of your heart failure:

- **Holter monitor (ambulatory electrocardiography, EKG/ECG).** For this test, a small box called a Holter monitor is attached to patches (electrodes) that are placed on your chest. The box may be carried in a pouch around your neck or attached to your belt. The Holter monitor is usually worn for 24 hours and provides a continuous recording of heart rhythm during normal activity.

- **Cardiac blood pool scan (radionuclide ventriculography or nuclear scan).** This test uses a radioactive imaging agent that is injected into a vein to outline chambers of the heart and blood vessels leading to the heart. This will show how well the heart is pumping blood to the rest of the body.
- **Cardiac catheterization.** A thin flexible tube is passed through an artery at the top of the leg (groin) or in the arm to reach the coronary arteries. This allows your doctor to study the inside of your arteries to see if there is any blockage. Your doctor can check the pressure and blood flow in the heart's chambers, collect blood samples from the heart, and examine the arteries of the heart by x-ray.
- **Coronary angiography**. This test is usually performed along with cardiac catheterization. A dye that can be seen by x-ray is injected into the coronary arteries. Your doctor can see the flow of blood to the heart muscle. Dye can also be injected into the chambers of the heart to evaluate the pumping function of your heart.
- **Exercise stress test**. EKG and blood pressure readings are taken before, during, and after exercise to see how your heart responds to exercise. The first EKG and blood pressure reading are done to get a baseline. Readings are then taken while you walk on an exercise treadmill or pedal a stationary bicycle. The test continues until you reach a heart rate set by your doctor. The exercise part of the stress test is stopped if chest pain or a very sharp rise in blood pressure occurs. Monitoring continues for 10 to 15 minutes after exercise or until your heart rate returns to baseline. An echocardiogram or nuclear scan is often included to evaluate the pumping function of your heart.
- **Thyroid functions tests.** These are common procedures done to find out how well the thyroid is functioning. They include blood tests, various imaging procedures, and stimulating thyroid function. These tests are very important because both an overactive and an underactive thyroid can be the main or a contributing cause of heart failure.

How is Heart Failure Treated?

The goals of treatment are to:

- Treat the underlying cause of your heart failure
- Improve your symptoms and quality of life
- Stop your heart failure from getting worse.
- Prolong your life span

Your doctor will continue to treat the underlying diseases or conditions (such as CAD, high blood pressure, or diabetes) that caused heart failure. The treatment for heart failure includes:

- Lifestyle changes
- Medications
- Specialized care for those in the most advanced stage.
- Lifestyle Changes

There are things that you can do to help with your treatment. Your doctor will recommend that you:

- Follow a diet low in salt. Salt can cause extra fluid to build up in your body making your heart failure worse.
- Limit the amount of fluids that you drink.
- Weigh yourself every day and let your doctor know right away if you have a sudden weight gain. This could mean you have extra fluid building up in your body.
- Exercise as directed to help build up your fitness level and ability to be more active.

Your doctor will also tell you to:

- Lose weight if you are overweight
- Quit smoking if you smoke
- Limit the amount of alcohol that you drink.

Medications

Your doctor will prescribe medicines to help improve your heart function and symptoms. The main medicines are:

- Diuretics (water or fluid pills) to help reduce fluid buildup in your lungs and swelling in your feet and ankles.
- ACE inhibitors to lower blood pressure and reduce the strain on your heart. These medications also may reduce the risk of a future heart attack.
- Beta blockers to slow your heart rate and lower your blood pressure to decrease the workload on your heart.
- Digoxin to make the heart beat stronger and pump more blood.

Specialized Care for Severe Disease

As the disease progresses, lifestyle changes and regular medications may not be enough to control worsening symptoms. Many people with severe heart failure must be put in the hospital from time to time for treatment. In the hospital, your doctor may prescribe new or special medicines. You continue to take your regular medicines during this treatment.

Your doctor will also order extra oxygen if you continue to have trouble breathing. The extra oxygen can be given in the hospital and at home.

Persons with very severe heart failure may be considered for a:

- Mechanical heart pump
- Heart transplant.

A heart pump is a special device placed inside the body to help pump blood to the rest of the body. There are different kinds of heart pumps. Some stay in the body for a short period of time, while others can stay in the body for a long time. Many people with a heart pump will also be considered for a heart transplant.

A heart transplant is surgery to replace the heart of a patient with heart failure with a healthy heart from someone who has recently died. A transplant is indicated in some people when all other treatments fail to control symptoms.

Preventing Heart Failure

The major underlying causes of heart failure are CAD (including angina and heart attack), high blood pressure, and diabetes. The section "What Causes Heart Failure?" lists all the likely causes. Getting treatment and staying in treatment for any underlying condition that you have can greatly reduce your risk.

Other things you can do reduce your risk include:

- Eating a heart-healthy diet low in salt, saturated fat, and cholesterol. The "Prevention" section of the "Your Guide to Lowering High Blood Pressure" Web site provides information and links on heart healthy eating.
- Quitting smoking if you smoke.
- Losing weight if you are overweight.

Living with Heart Failure

Heart failure usually cannot be cured and you will likely have to take medication for the rest of your life. It is important that you know that your symptoms may get worse over time. As your symptoms get worse, you may not be able to do many of the things that you did before you had heart failure.

Treatment can relieve your symptoms and make it easier to do some of the things that you like to do. Treatment can also reduce the chance that you will have to go to the hospital. For these reasons, it is very important that you follow your treatment plan. You must:

- Take all of your medications as your doctor prescribed
- Make all of the lifestyle changes recommended by your doctor
- Keep all of your doctor's appointments.
- Common causes of worsening of symptoms that can lead to a crisis or even a hospital visit are:
- Forgetting to take your medicines
- Not following your diet (such as eating salty foods)
- Drinking excessive amounts of alcohol.

If you have trouble following your diet, talk to your doctor. Your doctor can help arrange for a dietitian to work with you on how to keep to a healthy diet. Alcohol also makes your symptoms worse. If you drink alcohol, don't do so very often and limit yourself to one drink. If you have severe heart failure, you should not drink alcohol.

People with heart failure often have other serious conditions that require ongoing treatment. If you have other conditions, it is likely that you are taking medications for those conditions as well as for heart failure. When taking several medications, there is

always a chance for side effects and interaction between the medications. Tell your doctor immediately about any problems that you notice with your medications. Also, talk with your doctor before adding any new medicine. This includes over-the-counter medicines and herbal supplements.

It is also important that you try to avoid respiratory infections like the flu and pneumonia. Ask your doctor or nurse about getting a flu shot and pneumonia vaccination.

It is helpful to have certain information on hand in case you need to go to the hospital or doctor right away. You should plan now to make sure that you have:

- Phone numbers for the doctor, hospital, and people who can take you to the hospital or doctor
- Directions to the hospital and doctor's office
- List of medications you are taking.

Special Needs for Severe Heart Failure

In the advanced stages, heart failure is a progressive condition that can generally be expected to get worse and eventually lead to death. If you have severe disease and symptoms at rest, you can expect your condition to worsen. It is important that you and your family discuss what you can expect and your final treatment options with your doctor while you are able to do so. The time may come when you are unable to participate in discussions about your care.

Advance directives are documents that tell doctors and hospitals what treatment you want or do not want if you are too ill to speak for yourself. You and your family may decide that you only want treatment to make you comfortable. You, your family, and your doctor may also agree on whether you want treatment if your heart or breathing stops.

There are two types of advance directives:

- A living will provides directions and instructions
- A medical power of attorney names a person you trust to speak for you when you are unable to make decisions.

Advance directives are easy to prepare. You can do it yourself without a lawyer. The only requirement is that you are at least 18 years old. You may prepare your advance directive by:

- Simply writing down your wishes
- Completing a form that your doctor, the hospital, or health department may have
- Using a special computer software program for legal documents
- Going to a lawyer

Depending on the state where you live, the document may also need to be:

- Witnessed by 1 or 2 people
- Notarized

As long as you are able to make your own decisions, your advance directives will not be used and you can accept or refuse any medical treatment. But if you become seriously ill, you may not be able to make decisions about your own treatment.

Give a copy of your living will and power of attorney to a family member and keep another copy in a safe place. People with severe heart failure are in the hospital often. It is important that you or family a member bring a copy every time you go to the hospital.

Hospice care. As heart failure worsens, the time may come when treatment is no longer working. If you and your doctor agree that your treatments are not working, hospice care may be an option. Hospice is an organization that can comfort and support you and your family. A team of people provides hospice care. This team includes:

- Doctors
- Nurses
- Social Workers
- Nurse's Aides
- Chaplain
- Volunteers.

The goals of hospice care are to:

- Provide comfort rather than cures
- Give emotional support to you and your family
- Provide care that supports dying with dignity
- Provide spiritual support as requested by you and your family.

Hospice supports life and views dying as a natural process. Hospice will work with you and your family to provide the services you need.

Summary

- Heart failure is a condition where the heart cannot pump enough blood throughout the body.
- Heart failure does not mean that your heart has stopped or is about to stop working. But it does mean that your heart is not able to pump blood the way that it should.
- Heart failure is a serious condition that develops over time as the pumping action of the heart grows weaker.
- Heart failure is caused by other diseases or conditions that damage or overwork the heart muscle.
- The leading causes of heart failure are CAD, high blood pressure, and diabetes.
- About 5 million people in the United States have heart failure. Each year 550,000 people are diagnosed with heart failure. It causes or contributes to about 300,000 deaths each year.
- Heart failure can happen to anyone but is more common in people over 65 years of age, among women, and in African Americans.

- The most common symptoms of heart failure are shortness of breath, feeling tired, and swelling in the ankles, feet, legs, and sometimes the abdomen.
- An echocardiogram is the most useful test used to diagnose heart failure.
- The treatments for heart failure include lifestyle changes, medications, and specialized care for those with severe disease.
- People with severe heart failure are frequently admitted to the hospital.
- If you have a disease or condition that makes heart failure more likely, you may be able to prevent it by controlling or treating the disease or condition.
- Heart failure usually cannot be cured and you will likely have to take medication for the rest of your life. It is important that you know that your symptoms may get worse over time. As your symptoms get worse, you may not be able to do many of the things that you did before you had heart failure.
- If you have severe disease and symptoms at rest, you can expect your condition to worsen. It is important that you and your family discuss what you can expect and your final treatment options with your doctor while you are able to do so.